The Best Watershed-Based Plans in the Nation!

Michael Scozzafava

U.S. EPA

OWOW

Background & Purpose

States submit "best" recent example of WB planning for NPS Pollution:

1. Better Understand Progress
2. Identify Common Areas of Weakness
3. Uncover Innovative Techniques and Approaches

The Nine Elements: A Review

A. Source ID
B. Load Reduction Estimates
C. Management Measures
D. Technical and Financial Assistance
E. Education and Outreach
F. Schedule
G. Milestones
H. Evaluation Criteria
I. Monitoring Component

Evaluation Method

- Evaluation Criteria: Example, Element A

Elements and Evaluation Criteria	Satisfied	Level of Satisfaction	Page Reference
A. Identification of Causes & Sources of Impairment			
a. Sources of impairment are identified and described.	Yes	3	Sec. 1, pg 4
b. Specific sources of impairment are geographically identified (i.e. mapped)	Yes	4	Figure 3, pg. 7
c. Pollution loads are attributed to each source of impairment and quantified	No	0	
d. Data sources are accurate and verifiable, assumptions can be reasonably justified	Yes	2	
e. Watershed-level estimate of necessary pollution control is provided (i.e. overall load reduction goal)	No	0	

Scoring

- Evaluation Criteria
  - **0: Not Satisfied**: completely inadequate
  - **1: Partially Satisfied**: partial credit
  - **2: Satisfied**: minimally successful with weaknesses
  - **3. Fully Satisfied**: meets expectations
  - **4: Exceeds Expectations**: above and beyond

- Individual Elements
  - Level of Satisfaction (%) = Total Points Earned / [# of Evaluation Criteria * 4]

Results (example)

Individual Element Subtotal	Score	% Satisfied
Element 1	17	85%
Element 2	12	75%
Element 3	19	79%
Element 4	16	80%
Element 5	13	81%
Element 6/7	15	75%
Element 8	14	70%
Element 9	10	83%

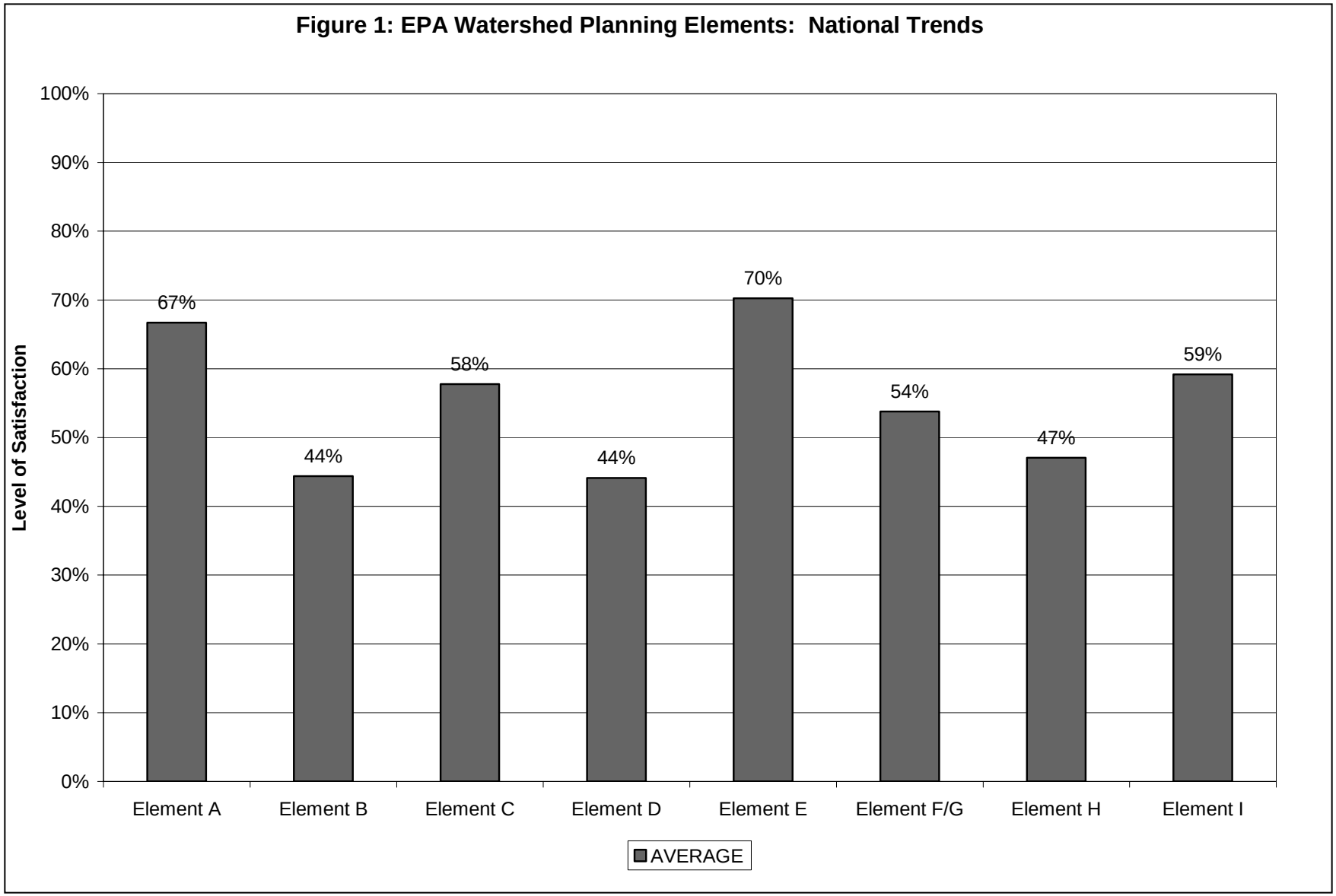
Qualitative Review

How Did The Plan Satisfy or Fail to Satisfy this Evaluation Criteria?	How Can The Plan Improve this Element (If Applicable) ?	Other Notes and Comments
		Excellent map
Current pollution loads are not provided	Calculate current loads attributable to each primary source	
No watershed-wide pollution goal	Develop TMDL or other pollution goal	Goal is necessary to guide implementation

Qualitative Review (example)

This is one of the best watershed-based plans in the country. Although, unlike some others, it is not formatted around the nine elements, it does a good job satisfying each at some point throughout the document. Particularly impressive is their inclusion of evaluation criteria, milestones, implementation needs, and expected load reduction for each management measure discussed. The plan's access to and utilization of available data is unparalleled. The G.I.S. database - though not necessarily required - is second to none and will continue to be a valuable resource for this watershed group for years to come. It will help track implementation progress and re-evaluate needs and goals as interim WQ measures come through. As such, the Corsica River seems poised for continued, sustained success in this Watershed-Based restoration effort.

National Trends



National Data Trends

- Most did well with Elements A & E (source ID and education components)

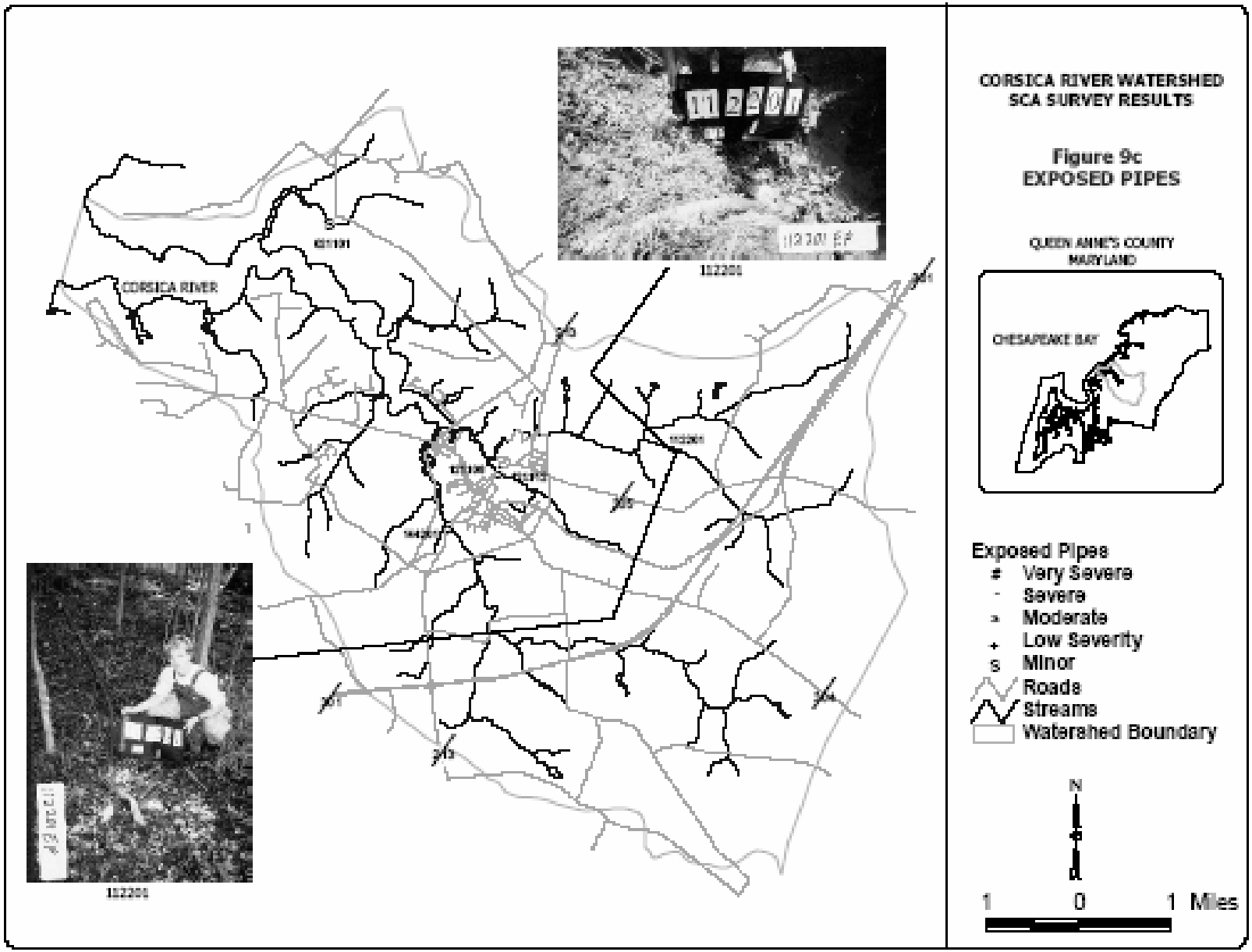
- Most difficulty with more technical, quantitative elements (caveat)
  - EPA's Watershed Planning Handbook

- Many Struggled to calculate expected load reductions
  - Necessary data not available, model too complicated
  - Some "best" plans have less-complicated methods
    - Share with the rest of the country

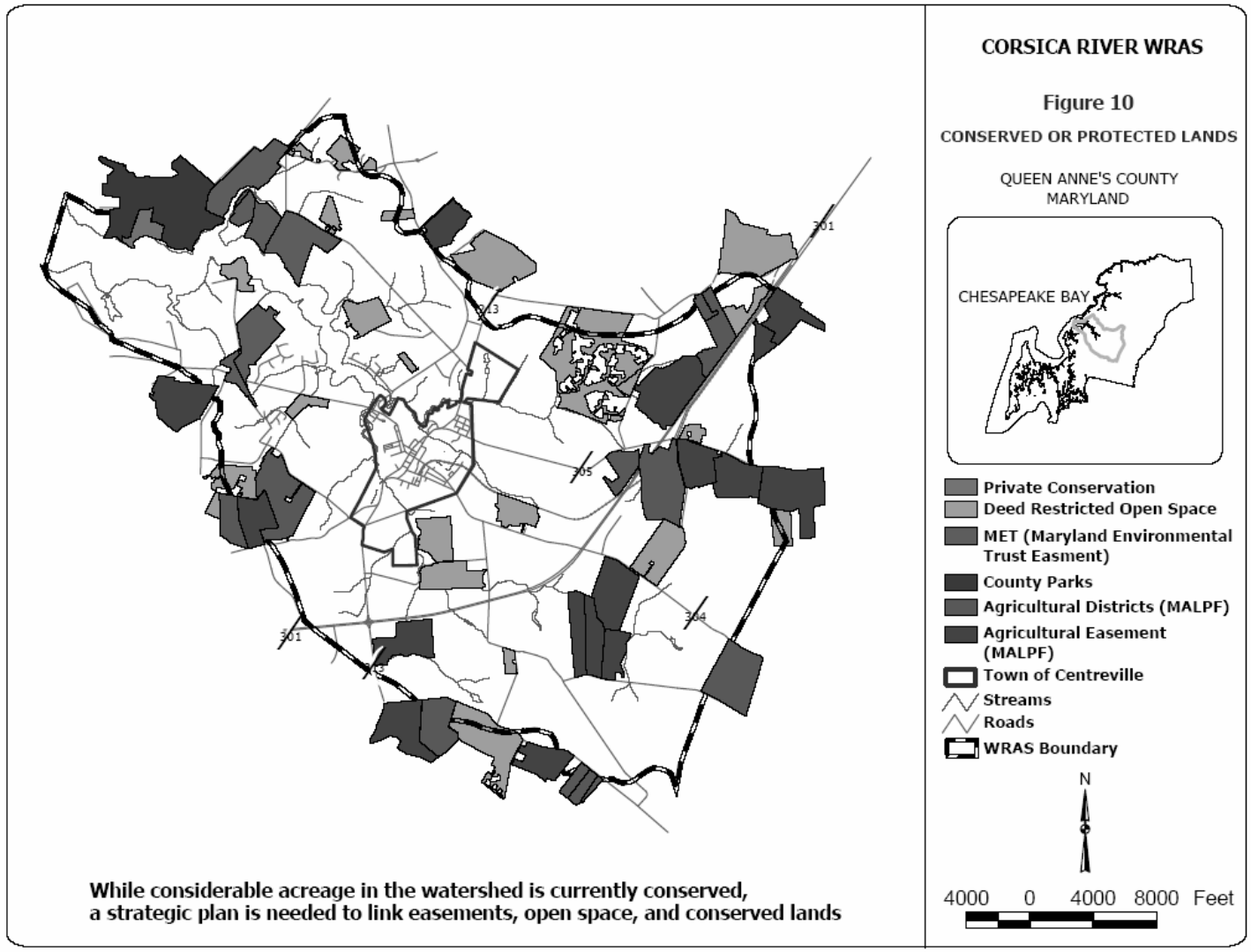
The "Best" Plans

- Corsica River Watershed (MD)
- Crab Orchard Creek Watershed (TN)
- South Branch, Yellow Medicine River Watershed (MN)
- Millers Creek Watershed (MI)
- Yellow Bank Creek Watershed (AL)
- Fort Cobb Watershed (OK)

Corsica River in MD



Corsica River in MD



Corsica River in MD

TABLE 5

Summary of Implementation Project Costs and Reductions			
Best Management Practice (BMP)	**Goal**	**Cost**	**Nutrient Reduction/Lbs.**
1. Nutrient Uptake	3,000 acres	$90,000.00	21,000 N, 570 P
2. AG Nutrient and Sediment Reducing Buffers	100 acres	($170/ac + staff) $67,000.00	9,188 N, 792 P
3. Whole Farm Nutrient Management and Horse Pasture Management	5 projects	($25,000.00/site) $125,00.00	15,977 N, 1,944 P
4. Household Pollution Reduction	400 acres	$3,696.00	634 N, 118P
5. Main Stem of the Corsica River: Water Quality Monitoring		$345,434.00	
6. Submerged Aquatic Vegetation (SAV) Reestablishment		$48,000.00	
7. Low Impact Development Technique in Ordinance Form		Ordinance $37,000.00/Regional BMPs $272,385.00	2,668 N, 236 P
8. Native Conservation Landscaping Demonstration Project		$78,410.00	Est. 70% Reduction
9. Easements Incentive Program	1,710 acres	($2,437.00 ac.) $4,167,270.00	
10. Creation of Non-Agricultural Wetlands		$22,000.00	
11. Septic System Retrofits		$141,000.00	28,905 N
12. EcoTeams		$93,500.00	
13. Turbidity Reduction		(cost for first 10 ac.) $145,000.00	
Total with All Programs, Complete		**$9,423,320.00**	
Total without Easements (9) and Total Septic Conversion (11)		**$1,378,550.00**	

Ft. Cobb Watershed in OK

- 70% Phosphorus Reduction Goal

- SWAT Model Scenario Analysis

Option 1:

Practice	Resulting P Load Reduction
No-till all wheat and other row crop	34%
Convert 20% worst cultivated land to pasture	25%
Riparian Buffer in 100% of watershed	50%
Nutrient Management Plan for all producers	35%
Grade Stabilization Structures where necessary to control erosion	Unknown
Total Reduction Rate	84%

Option 2:

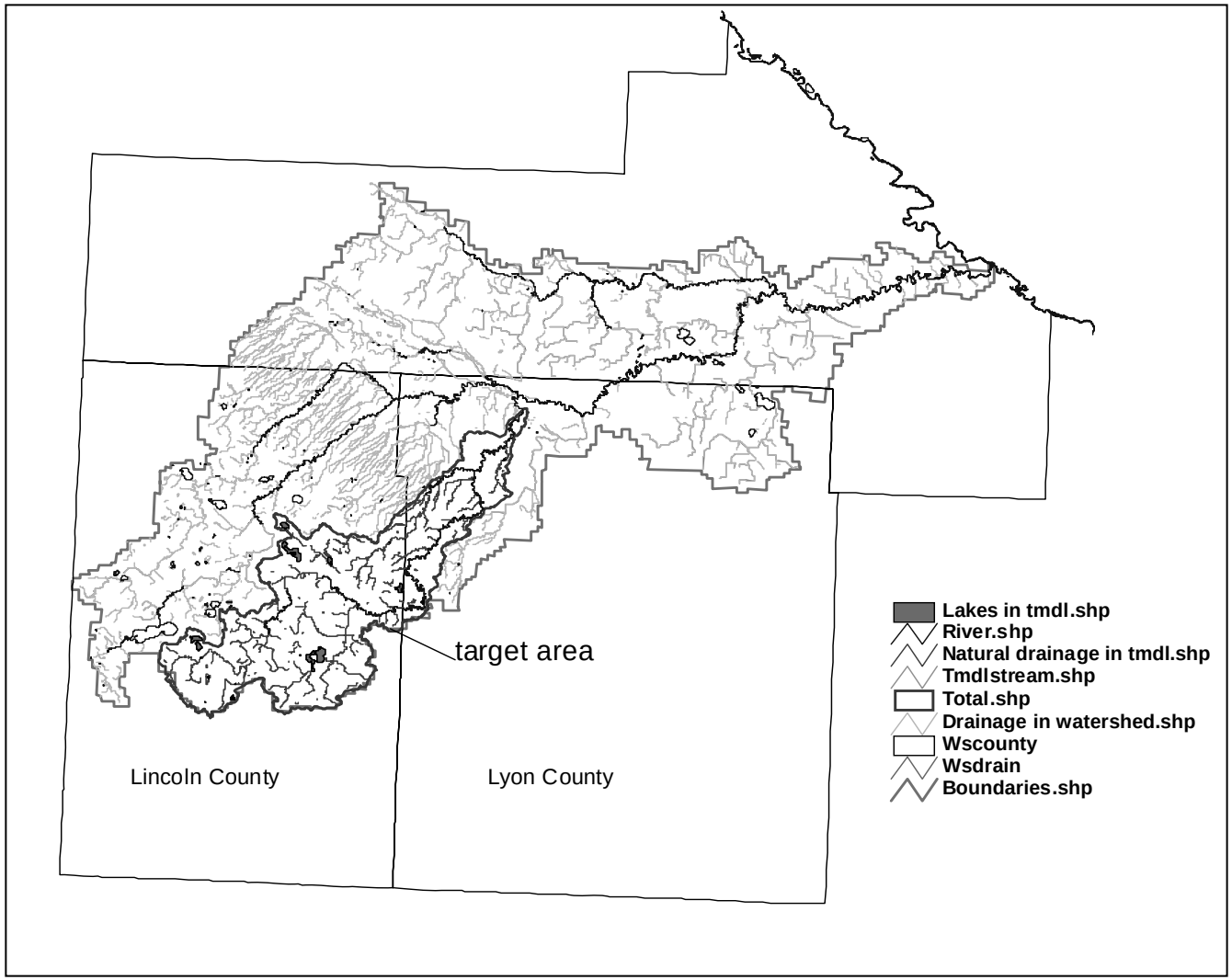
Practice	Resulting P Load Reduction
No-till 60% of wheat and other row crop	20.4%
Convert 10% worst cultivated land to pasture	18%
Riparian Buffer in 80% of watershed	40%
Nutrient Management Plan for 70% of producers	24.5%
Grade Stabilization Structures where necessary to control erosion	Unknown
Total Reduction Rate	70.4%

Option #3: Lowest investment, best option

Option 3:

Practice	Resulting P Load Reduction
No-till 50% of wheat and other row crop	17%
Convert 20% worst cultivated land to pasture	25%
Riparian Buffer in 60% of watershed	30%
Nutrient Management Plan for 90% of producers	31.5%
Grade Stabilization Structures where necessary to control erosion	Unknown
Total Reduction Rate	**70.2%**

South Branch Yellow Medicine River, MN



South Branch Yellow Medicine River, MN

Table 1.1 Inventory of Fecal Coliform Producers in the South Branch TMDL Watershed

Category	Sub-Category		Animal Units	Number
Livestock	The basin contains an estimated 93 livestock facilities ranging in size from 1 animal units to 733 animal units	Dairy	1757	
		Beef	4916	
		Swine	1737	
		Sheep	567	
		Chicken	31	
		Horse	45	
Human	Rural Population with Inadequate Wastewater Treatment*			909
	Rural Population with Adequate Wastewater Treatment			271
	Municipal Waterwater Treatment Facilities			1
Wildlife	Deer (average 10 per mile)			1218
	Other It was not possible to obtain estimates for other wildlife. This sub-category was estimated using an equivalency to deer in the basin.			
Pets	Dogs and Cats in Urban Areas**			812
	Dogs and Cats in Rural Areas***			618

* 77% non compliant

** 1550 people / 2.5 people/household, 0.58 dogs/household, .73 cats/household

*** 1180 people / 2.5 people/household, 0.58 dogs/household, .73 cats/household

Crab Orchard Creek, TN

- Spreadsheet Method to Calculate Load Reductions
- Series of Formulas, culminating:
  - Post-reclamation net alkalinity (mg/L) = Background alkalinity (mg/L) – Total post-reclamation acidity (mg/L)
- Replicable Method

Crab Orchard Creek, TN

Table 3-1. Crab Orchard Creek Watershed AMD Site Reclamation Measures.

AMD Site(s)	Subwatershed	Reclamation Measures	Expected Lifetime
Eddie Walls (1A and 1B)	Golliher Creek	2 limestone treatment ponds	32/52 years
		1 wetland	Indefinite
		Regrade/revegetate	Permanent
Fagan Mill	Fagan Mill Creek	1 limestone treatment pond	61 years
		1 wetland/settling pond	Indefinite
Little Laurel Highwall	Crab Orchard Creek 03 (A and B) Little Laurel Creek	Backfill ponds and highwall	Permanent
		Regrade/revegetate	Permanent
Mine Field	Crab Orchard Creek 03 (A and B) Little Laurel Creek	2 limestone treatment ponds	31/34 years
		1 wetland/settling pond	Indefinite

Millers Creek Watershed

Michigan

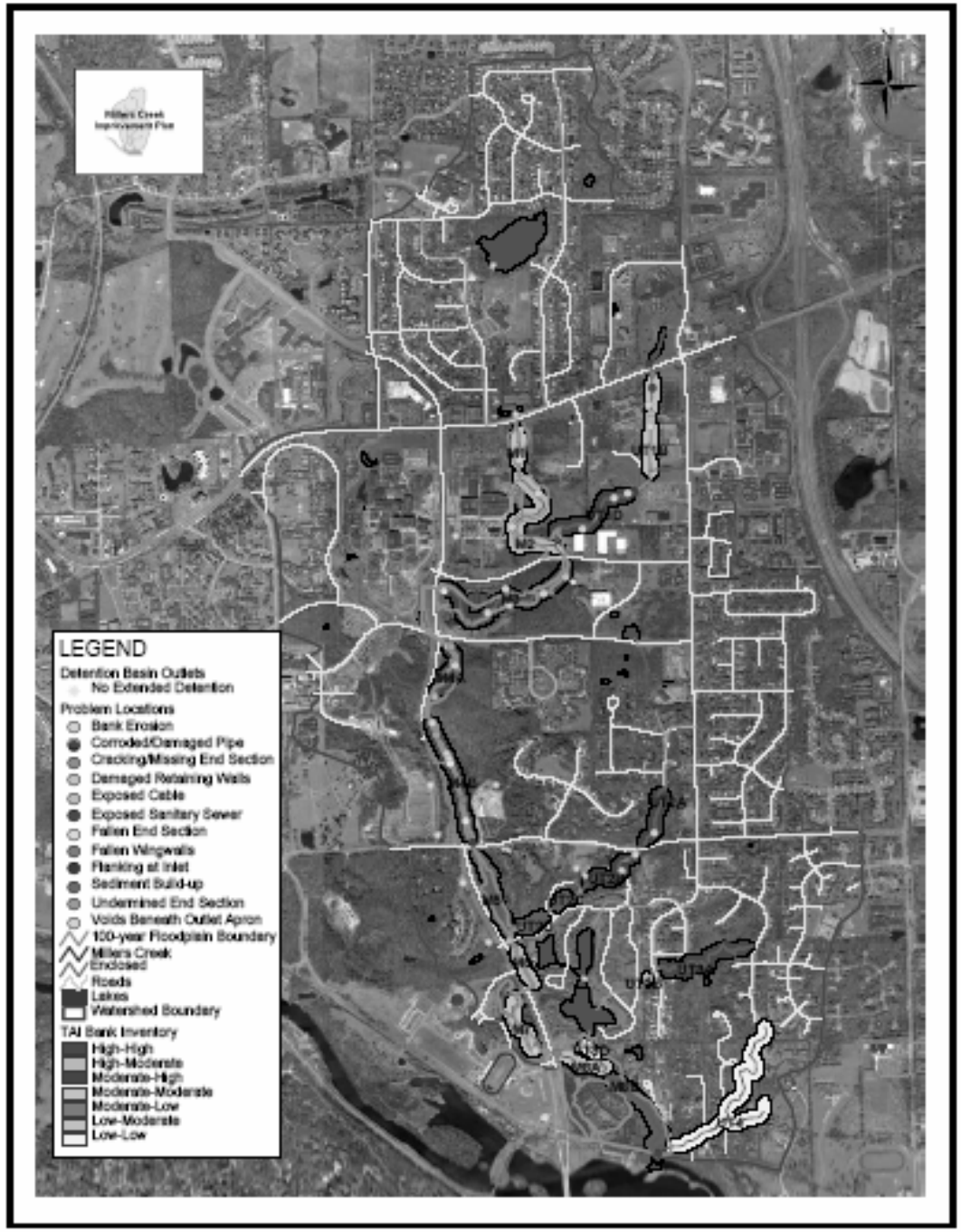


Figure 5.5 Problem Areas throughout the Millers Creek Watershed

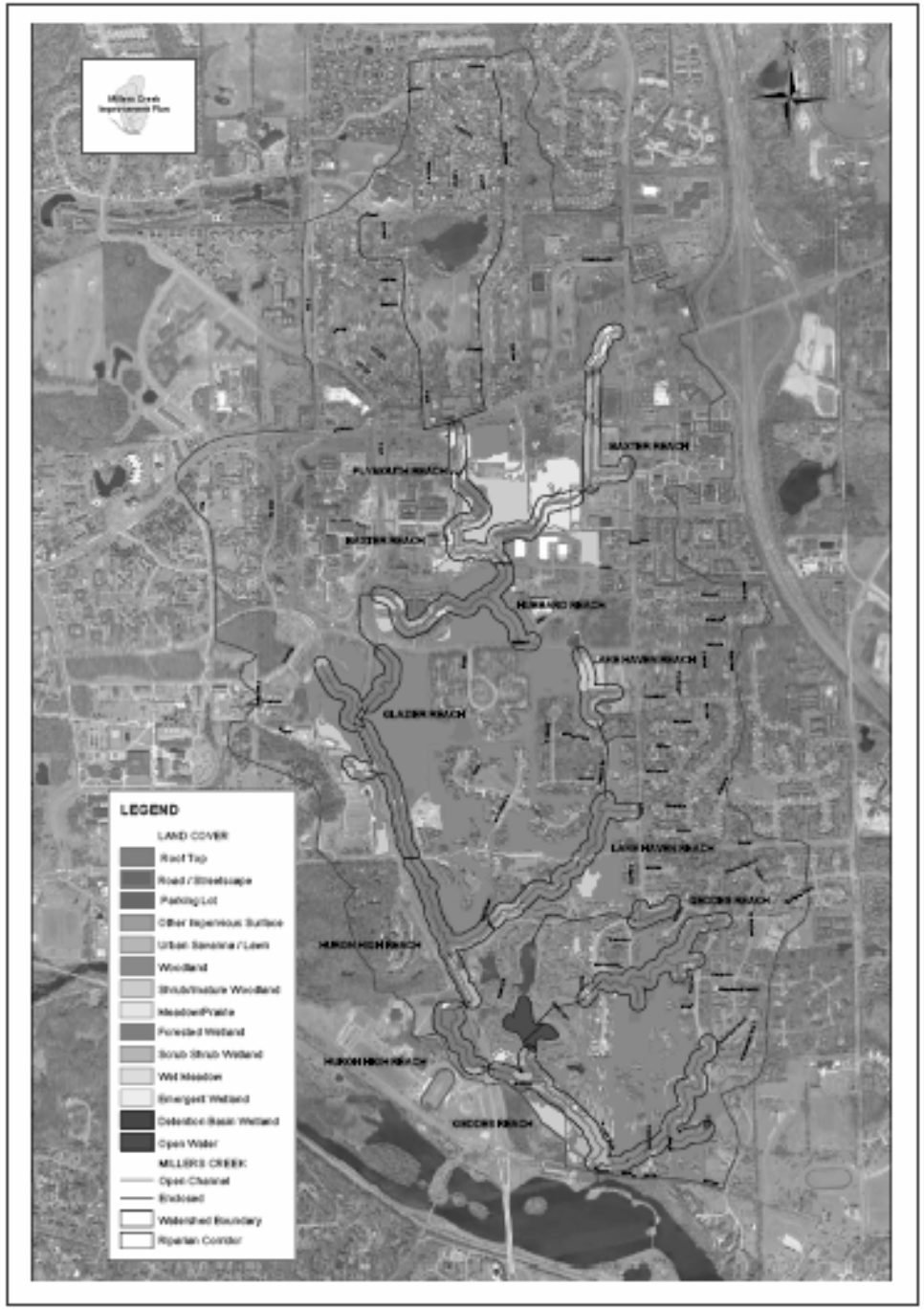


Figure 5.11 Riparian Corridor Land Cover and Contiguous Natural Plant Communities

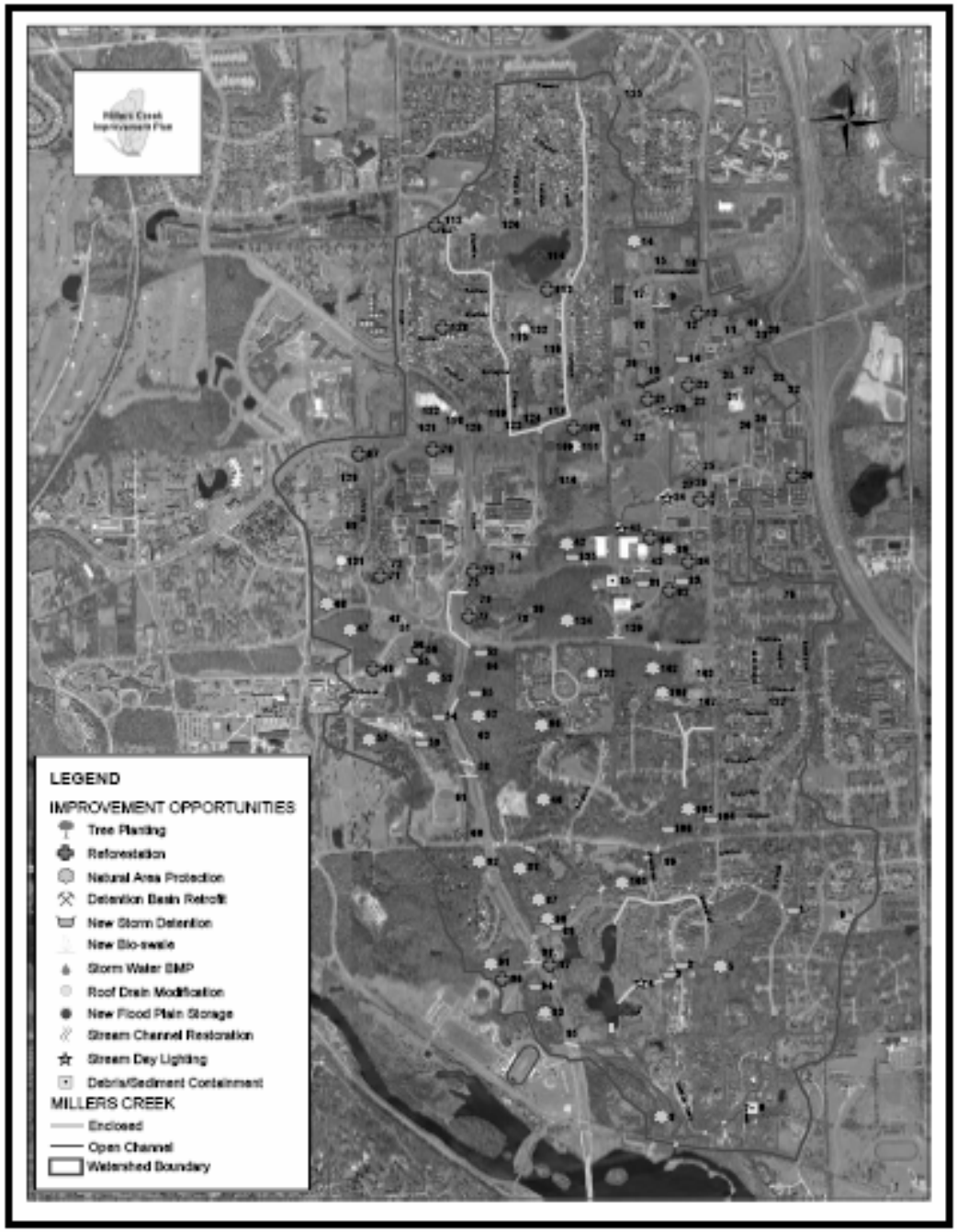


Figure 6.1 Locations of All Identified Improvement Opportunities

Yellow Bank Creek Watershed, Alabama

Item Description	Number	Average Cost	Budget Federal	Nonfed	Total
Channel bank vegetation	20 acres (seed, sod, tree planting; lime, fertilizer; land preparation)	800/ac	10,667	5,333	16,000
Critical area planting (seed, lime, fertilizer; grading and shaping)	20 acres (seed, lime, fertilizer; grading and shaping)	164/acre	2,187	1,093	3,280
Fencing	6,567 ft (4 strand barb; steel post)	0.77/ft	3,371	1,686	5,057
Fence gate assembly	15 (14-ft each)	190 each	1,900	950	2,850
Livestock exclusion	13,133 ft (4 strand barb; steel post)	0.77/ft	6,741	3,371	10,112
Pasture hayland planting	100 acres (seed, lime, fertilizer)	164/acre	10,933	5,467	16,400
Well drilling and casing	3 each (300 ft depth)	21/ft	12,600	6,300	18,900
Piping	6,800 ft (1” PVC to water troughs)	0.85/ft	3,853	1,927	5,780
Pumps	3 each (livestock alternative water)	1,110 each	2,227	1,113	3,340

Yellow Bank Creek Watershed, Alabama

BMP	Number, size, area, etc.	Estimated Costs
Grazing land Vegetation Improvements	250-A	25,500
Fencing for Rotational Grazing	30,000-ft on 150-A	15,000
Fencing for Livestock Exclusion	20,000-ft on 100-A	16,000
Livestock Stream Crossings Installed	25	60,000
Conservation Tillage	1,540-A	185,000 (over 3 years)
Livestock Water Supply	10	10,000
Riparian Buffers Expanded/Installed	Expand Existing to 300-ft Establish new (min. 35-ft)	40,000
Conservation Plans for Pesticide Management	1500-A cropland 250-A pastureland	Incorporated in Technical Assistance /Coordinator
Conservation Plans for Soil Erosion	80% of cropland	Incorporated in Technical Assistance /Coordinator
Technical Assistance / Coordinator	3 years	100,000

Common Mistakes

- Scale
  - Write a plan for a watershed area with 20+ TMDLS or over 10 12-Digit HUC watersheds
- Omit Key Components
  - Monitoring and/or Load Reduction Calculations
- Forget to Set a Goal
- No Adaptive Management

Unexpected Challenges

- Planning for Future Activities
  - Will 319 Work plans supplement missing elements from the WB-based plan?
- Level of Detail/Accuracy of Models
  - How accurate should load reduction calculations be?
- Getting the Data You Need

Recommendations Moving Forward

- Share Results
- Guidance Document of Examples of Each Element
- Distribute the "Best" Plans
- System for Continual Knowledge-Sharing and Collaboration

Recommendations Moving Forward

- EPA Should Exercise Greater Oversight
- Better Training and Guidance to Demonstrate "Level of Detail"
- Continue to Evaluate Plans
  - (This review was only 30)